REMARKS

Rejection of Claims 1, 2, 4-9, 13-18, 20, and 22 under 35 U.S.C. § 103 (a) as being unpatentable over US 5,722,056 (Horowitz) in view of 'Noise Performance of a Cartesian loop Transmitter' (Kenington)

Applicant respectfully traverses the rejection of claims 1, 2, 4-9, 13-18, 20, and 22. Reconsideration is respectfully requested.

Applicant respectfully submits that the combination of Horowitz and Kenington does not teach or suggest all the claim limitations as set forth in independent claims 1, 13, 20, and 22. Specifically, independent claims 1 and 20 recite "at least one adjustable zero element and at least one adjustable pole element are operable to change the loop bandwidth of the feedback loop", and independent claims 13 and 22 recite "moving a pole in the loop frequency response using the at least one adjustable pole element yielding a change in the closed loop frequency response," which are not taught or suggested in the combination of Horowitz and Kenington.

Horowitz is directed to a linearizer arrangement for compensating for non-linearity in a power amplifier, for example a cartesian loop with training arrangement, wherein the linearizer arrangement is characterized by an automatic gain control means in the amplifier loop and control means to maintain a constant closed loop gain (see col. 2, lines 41 through 49 and col. 8, lines 3 through 7 of Horowitz). Kenington is directed to a derivation of the noise performance of a cartesian loop transmitter and highlights the design methods that may also be employed in order to optimize its noise performance (see abstract, Kenington).

In pages 3 and 4, item 5, section titled" *Response to Arguments*", the Office Action states that Horowitz discloses in training mode, operating conditions such as temperature and frequency are varied (col. 2, lines 11-12). Further, the Office Action states that Horowitz teaches that the closed loop gain is adjusted or changed or varied during amplitude training according to prestored operating condition adjustment factors in a look up table with varying RF frequencies (col. 5, lines 47-52; col. 6, lines 5-56). The Office Action also states that the zeros, poles and gain in the AGC block or circuitry of the radio transmitter depends on the location of Horowitz's attenuators (Fig.2; elements

33 and 34) in the forward path. The Office Actions also states that Horowitz's AGC circuitry which changes the loop bandwidth of the cartesian feedback loop reads on the Applicant's claimed feature of "at least one adjustable zero element and at least one adjustable pole element are operable to change the bandwidth of the feedback loop" and "moving a pole in the loop frequency response using the at least one adjustable pole element yielding a change in the closed loop frequency response."

Applicant respectfully disagrees with the above statements of the Office Action. Specifically, Applicant disagrees with the Office Action's interpretation of Horowitz's automatic gain control (AGC) circuitry. AGC component (26) as described in Horowitz attempts to maintain constant closed loop gain during the training mode. In order to maintain constant closed loop gain during the training mode, Horowitz's AGC component adjusts the training signal to compensate for loop gain variations due to temperature, frequency etc (col.2, lines 11-12, Horowitz). <u>In other words, Horowitz's system does not change the loop bandwidth, rather it maintains a constant loop gain, which will result in a same loop bandwidth in contrast to Applicant's feedback loop where the loop bandwidth is changed</u>. So, Horowitz's feedback loop cannot provide multiple bandwidths or it cannot allow a different bandwidth input" signal to be used, i.e. Horowitz's feedback loop cannot "change the loop bandwidth" or "change the closed loop frequency response" as described in Applicant's claims. For example, in page 10, lines 16-20 of the Applicant's specification as filed, Applicant recites "changing of the pole and zero locations can be done, for example, to change the closed loop bandwidth to allow a different bandwidth input signal, to adjust the stability properties of the feedback loop by changing the gain margin and/or phase margin, or to change the noise performance of the loop."

Further, Horowitz, in column 2, lines 42-48, discloses "activating the automatic gain control means during at least a portion of the training mode of operation to maintain constant closed loop gain during that portion and to deactivate the automatic gain control means during a transmit mode of operation" which further suggests that Horowitz's objective is not to change the loop bandwidth, but to maintain the constant loop gain by activating the automatic gain control means only during the training mode of operation.

The Office Action further refers to column 5, lines 47-52 of Horowitz as describing or being analogous to Applicant's claimed features of "at least one adjustable zero element and at least one adjustable pole element are operable to change the loop bandwidth of the feedback loop", or "moving a pole in the loop frequency response using the at least one adjustable pole element yielding a change in the closed loop frequency response." In column 5, lines 47-52, Horowitz recites "adjustment of open loop gain during phase training according to pro-stored operating condition adjustment parameters…adjustment of closed loop gain during amplitude training according to prestored operating conditions". In this passage, Horowitz does not teach or suggest changing the loop bandwidth. Rather this passage suggests that in order to maintain constant closed loop gain, the loop variations are compensated using the prestored operating conditions, however this compensation for loop variations does not bring a "change [in] the loop bandwidth" or "change in the closed loop frequency response" as described in Applicant's claims. In column 7, lines 35-38, Horowitz discloses "dynamics inside the AGC block 25 (zeros, poles and gain) are dependent on location of the attenuators 33 and 34 in the forward path" which actually suggests that the zeros and poles are fixed in Horowitz in contrast to adjustable zero element and adjustable pole element in Applicant's claims.

The Office Action states that page 474, section IV of Kenington provides evidence that including the complex effects of poles and zeros or adjustable poles and zeros in a cartesian loop transmitter can predict the frequency and magnitude of a peak that is based on a large maximum loop gain. Further, the Office Action refers to Table 1; Fig. 11; page 467-468, section II; page 474, section IV of Kenington and states "Kenington discloses a Cartesian feedback loop (Fig. 1) and further discloses at least one adjustable zero element coupled and at least one adjustable pole element around the feedback loop, wherein the at least one adjustable zero element and at least one adjustable pole element are operable to change the loop bandwidth of the feedback loop." Applicant disagrees. Instead, in table 1; Fig. 11; page 467-468, section II; page 474, section IV, Kenington describes a "typical noise 'frequency response'" or in other words "the frequency characteristics of the noise" (see page 473). More particularly, the cited passage in Kenington describes what is illustrated in figures 11 and 12 of the paper,

which is namely that "at high values of loop gain, a peak in the [noise frequency] response exists around 4.5 MHz . . . [which] will manifest itself as peaks in the noise floor". The reference then goes on to point out that this "first-order model used to produce the graph in FIG. 11 is not sufficiently accurate at high frequencies to be able to predict the frequency and magnitude of the peak. . . A more accurate model would need to include the complex effects of the poles and zeros around the loop".

With reference to above citation, Kenington, at best, describes a noise frequency response and mentions that poles and zeros can have complex effects around the loop (although such effects are not shown in the drawings or described in the text). Whereas Applicant's claimed invention is directed to adjustable poles and zeros that operate (when moved) to change the loop bandwidth of the feedback loop and/or to yield a change in the closed loop frequency response. Further, Kenington's effect of poles and zeros merely suggests effects of a predefined placement of poles and zeros based on the "practical Cartesian loop transmitter [that] was constructed" for purposes of testing the noise models set forth in the paper (see page 470), but does not suggest moving a pole in the loop frequency response using at least one adjustable pole element to yield a change in the closed loop frequency response as set forth in independent claims 13 and 22.

Accordingly, the combination of Horowitz and Kenington do not teach or suggest the claim limitation of "at least one adjustable zero element and at least one adjustable pole element operable to change the loop bandwidth" as recited in independent claims 1 and 20, and the limitation of "moving a pole in the loop frequency response using the at least one adjustable pole element yielding a change in the closed loop frequency response" as recited in independent claims 13 and 22, so the Applicant respectfully requests withdrawal of the rejection of claims 1, 13, 20, and 22 under 35 U.S.C 103.

For the above reasons, Applicant submits that claims 1, 13, 20 and 22 are not obvious in view of the combination of Horowitz and Kenington, and therefore that the rejection of claims 1, 13, 20 and 22 under 35 USC 103 should be withdrawn. Applicant requests that claims 1, 13, 20 and 22 may now be passed to allowance.

Dependent claims 2, 4-9, 11, and 14-18 depend from, and include all the limitations of independent claims 1, 13, 20 and 22. Therefore, Applicant respectfully requests the reconsideration of dependent claims 2, 4-9, 11 and 14-18 and requests

withdrawal of the rejection of these claims. Applicant requests that claims 2, 4-9, 11, and 14-18 may now be passed to allowance.

Rejection of claims 1, 2, 4-9, 13-18, 20 and 22 under 35 U.S.C. § 102 (e) as being anticipated by US 6,859,097 (Chandler)

In response to the Office Action dated January 2, 2008, Applicant herein re-submits a declaration under 37 C.F.R. § 1.131 swearing behind the reference U. S. Patent No. 6,859,097 (Chandler) relied upon in the Office Action to support a rejection under 35 U.S.C. 102(e) of claims 1, 2, 4-9, 13-18, 20 and 22. The declaration, including the attachment referenced therein, serves to establish conception in the United States of the subject matter of claims 1, 2, 4-9, 13-18, 20 and 22 in the present patent application on a date prior to the earliest effective date of the Chandler patent of May 14, 2001 coupled with diligence to the reduction in practice on or about January 12, 2002. Applicant had earlier submitted a declaration under 37 C.F.R. § 1.131 that was deemed insufficient to establish diligence. Therefore, Applicant submits an amended declaration, which Applicant believes overcomes any deficiencies in the previously submitted declaration. Accordingly, Applicant respectfully requests the withdrawal of the rejection and allowance of claims 1, 2, 4-9, 13-18, 20 and 22.

The Office Action, in page 2, item 2 states that the written disclosure (ID No. 4766H) fails to disclose the conception relating to the invention in claims 8, 11 and 14. Applicant submits that, in page 4, Figure 2 (circuit diagram for pole element), Applicant's written disclosure recites “allow selection of a wide range of resistor values” which along with the components illustrated in the circuit diagram of Figure 2 teaches the feature of "adjustable pole element comprising a plurality of elements having impedance that can be selectively coupled to other elements of the circuit" as recited in claim 8. Regarding claim 14, Applicant submits that, in page 4, Figure 2, Applicant’s written disclosure recites "selects from a group of internal resistors…sets the desired position of P2" which along with the components illustrated in the circuit diagram of Figure 2 establishes the conception for the feature of "step of moving a pole is accomplished by switching among a plurality of elements having different impedances" as recited in claim 14.

In addition, Applicant respectfully traverses the rejection of claims 1, 2, 4-9, 13-18, 20, and 22. Reconsideration is respectfully requested.

Applicant respectfully submits that Chandler does not anticipate, either expressly or inherently, each and every element as set forth in independent claim 1, 13, 20 and 22. For example, independent claims 1, 13, 20 and 22 recite "at least one adjustable zero element [coupled] between the input of the feedback loop and the power amplifier [in the forward path of the feedback loop]" which is not anticipated either expressly or inherently, in Chandler.

Chandler is directed towards a radio frequency feedback amplifier circuit of high linearity including a forward path having a high gain amplifier and a linear passive feedback circuit, where the high gain amplifier incorporates a bandpass filter in the form of a single resonator which may be tuned so that its resonant frequency is at substantially the signal frequency.

In column 7, lines 48-49, Chandler discloses "[i]t may be desirable to implement a zero in the feedback path to improve dynamic performance and stability" and further in column 10, lines 35-40, Chandler discloses "feedback means in the form of linear passive circuit, wherein means are provided to implement a pole zero pair in a circuit sampling the output of the amplifier means in which the response is achieved by combining signals from points at different phases in the main signal path." These passages suggest that the zero pair is actually used in the feedback path in the Chandler, and further Chandler does not suggest that the adjustable zero element is coupled between the input of the feedback loop and the power amplifier. Therefore, Chandler fails to teach or suggest the limitation of "at least one adjustable zero element [coupled] between the input of the feedback loop and the power amplifier [in the forward path of the feedback loop]" as described in independent claims 1, 13, 20 and 22. Therefore the rejection of claims 1, 13, 20 and 22 under 35 USC 102(e) should be withdrawn. Applicant requests that claims 1, 13, 20 and 22 may now be passed to allowance.

Further Applicant submits that Chandler fails to teach or suggest "the feedback loop is a cartesian feedback loop" as recited in claim 6. For example, in page 6 of the Applicant's specification as filed, Applicant discloses "Cartesian feedback loop 200 is referred to as cartesian because it operates on a complex input signal." In contrast,

Chandler's radio frequency feedback amplifier circuit operates entirely at radio frequency, and even figures 1 through 18 fail to depict a loop that operates on a complex input signal. Further, the Office Action states that col. 2, lines 1-12 and FIG. 13 of Chandler disclose that the feedback loop is a cartesian feedback loop. Applicant disagrees with this interpretation. In col 2, lines 1-12, Chandler describes that the technique of bandpass feedback is qualitatively different to simple RF feedback and then Chandler goes on to state that the bandpass feedback, like cartesian feedback, is only concerned with the instantaneous complex envelope of the signal. However, this passage merely compares how the bandpass feedback is qualitatively different from simple RF feedback, but this does not suggest that Chandler's feedback loop is a cartesian feedback loop and further Chandler has used the term "radio frequency" in conjunction with the feedback amplifier circuit throughout the reference, thereby suggesting that Chandler's feedback loop operates on radio frequency signal, but not on the complex input signal. Even FIG. 13 of Chandler fails to illustrate that the feedback loop operates on the complex input signal or the feedback loop is a Cartesian feedback loop. Therefore, Chandler fails to show or suggest the limitation of "the feedback loop is a cartesian feedback loop" as recited in claim 6.

Dependent claims 2, 4-9, 11 and 14-18 depend from, and include all the limitations of independent claims 1, 13, 20 and 22. Therefore, Applicant respectfully requests reconsideration of dependent claims 2, 4-9, 11 and 14-18 and requests the withdrawal of the rejection.

<u>Acknowledgement of Allowable Subject Matter</u>

Applicant thanks the Examiner for indicating the allowability of claim 12 once amended to be rewritten in independent form to include the limitations of the base claim and any intervening claims. Applicant defers amending the claim to give the Examiner the opportunity to consider Applicant's remarks enclosed herein.

Conclusion

Applicant has reviewed the other references of record and believes that Applicant's claimed invention is patentably distinct and nonobvious over each reference taken alone or in combination. Applicant respectfully requests that a timely Notice of Allowance be issued in this case. Such action is earnestly solicited by the Applicant. Should the Examiner have any questions, comments, or suggestions, the Examiner is invited to contact the Applicant's attorney or agent at the telephone number indicated below.

Please charge any fees that may be due to Deposit Account 502117, Motorola, Inc.

Respectfully submitted,

SEND CORRESPONDENCE TO:

Motorola, Inc.
1303 East Algonquin Road
IL01/3rd Floor
Schaumburg, IL 60196
Customer Number: 22917

By: /Valerie M. Davis/
Valerie M. Davis
Attorney of Record
Reg. No.: 50,203

Telephone:847-576-6733
Fax No.: 847-576-0721
Email: vdavis@motorola.com